TABLE NO | | |

STUDENT ID NO | | | | | | | | | | |

MULTIMEDIA UNIVERSITY

SUBJECT CODE _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

TSE3351/TSE3571 – SOFTWARE EVOLUTION AND MAINTENANCE

(All sections / Groups)

30 MAY 2017
9:00 am – 11:00 am
(2 Hours)

Question	Mark
A	
B	
C	
D	
Total	

Examiner 1 Signature: _____

Examiner 2 Signature: _____

Examiner 3 Signature: _____

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 10 printed pages (including cover page) with 4 Sections only.

2. Attempt **ALL** questions in **SECTION A, SECTION B, SECTION C and SECTION D**. The distribution of the marks for each question is given.

3. Please write all your answers **CLEARLY** in the specific answer box provided for each question. Submit this question paper at the end of the examination.

Attempt ALL questions in SECTION A, B, C and D.

Section A (12.5 marks)

A1. What is software maintenance? Explain with TWO reasons why is software maintenance important to an airline traffic system.

(1 + 3 marks)

A2. "A system currently in used, is never finished to evolve." Why?

(1 mark)

Continued...

A3. A software maintenance framework consists of SIX components: User environment, Organizational environment, Maintenance, Process & Personnel, Software, and Operational environment.

A3(a) Draw the software maintenance framework showing the relationship between the SIX components.

(4.5 marks)

A3(b) These components interact with each other based on THREE types of relationships. List the THREE types of relationships.

(3 marks)

Continued...

Section B (12.5 marks)

HouseMaker system consists of multiple mobile robots and a GUI (Graphical User Interface) that makes such robots ideal for housework. People start using them just like home appliances: a cooking robot, a vacuuming robot, and so on. They will also have new home appliances that can move around the open environment – for example, a robot that brings them their coffee every morning or moves items according to their instructions. Other examples might be an automatic book-shelf or cupboard that organizes its contents, movable trash bins that collect rubbish around a room as scheduled, and a self-making bed.

Based on the above scenario, answer questions Q-B1 to Q-B4:

B1. Draw the generic life cycle of software production process, containing the FIVE stages of evolution for the abovementioned HouseMaker system.

(3 marks)

B2. What are the THREE components of a software process when maintaining the HouseMaker system? Why software production process is necessary?

(1.5 + 0.5 marks)

Continued...

B3. Code-and-Fix model is a simple 2-phases model. Explain the TWO weaknesses of Code-and-Fix model when applied to the above HouseMaker system.

(1 + 1 marks)

B4. Knowing these weaknesses, why do we still use Code-and-Fix model for the HouseMaker system? Explain on how Code-and-Fix model be used with other software development model.

(2 + 1 marks)

Continued...

B5. The Boehm's management decisions model consists of FOUR components: Management decisions, Change implemented, Software in use, and Evaluation.
B5(a) Draw the Boehm's management decision model to indicate the relationship between the FOUR components.

(1 mark)

B5(b) Explain how these components work in terms of management decisions and cost-benefit evaluations.

(0.5 + 0.5 marks)

B5(c) How is the Boehm's maintenance process being represented?

(0.5 marks)

Continued...

Section C (12.5 marks)

The current generation of Internet of Things (IoT) on health-care big data software systems (such as smart supply chain management, and smart energy grids) combines multiple independent data analytics models, historical data repositories, and real-time data-streams that are likely to be available across geographically distributed data centers (both private and public).

Companies must combine and analyze this distributed data along with contextual factors such as weather forecasts and pricing positions to establish which factors strongly influence the demand of particular products. Actions can then be taken immediately to adapt to such competitive and evolving environments. Similarly, health-care IoT software systems require churning through massive amounts of heterogeneous, real-time information available from social media, emergency rooms, health departments, hospitals, and ambulatory care sites to detect outbreaks of deadly diseases such as MERS and dengue fever.

C1. You are appointed as the software maintainer of this IoT system. Discuss any SIX issues that can contribute to high maintenance costs. What steps would you take to minimize the effects of high maintenance costs?

(3 + 3.5 marks)

Continued...

C2. Referring to your solution in Question C1, what are the SIX factors that can affect the maintenance personnel to acquire the necessary knowledge for maintaining the abovementioned system?

(3 marks)

C3. Explain the following software product attributes of decision-support:

C3a. Complexity.

(1 mark)

C3b. Maintainability.

(1 mark)

C4. Describe how would the software product attributes in Question C3 help to guide maintenance personnel in the IoT system.

(1 mark)

Continued .....

Section D (12.5 marks)

Consider the field service of health software maintenance. The typical approach is to provide a view of maintenance schedules and analysis of field reports. However, the volume of information from sensors and hidden signals from degrading performance is not perceivable by humans. As such, maintenance tools can provide the intelligence of processing performance data to predict or prevent un-expected maintenance events.

D1. What are the FOUR factors that provide motivation for maintaining the above health software?

(2 marks)

D2. Explain THREE purposes for the above health software maintenance tools.

(1.5 marks)

Answer

Continued...

D3. Explain the FIVE guidelines in producing good software documentation.

(5 marks)

D4. What is software reuse? Provide SEVEN benefits that can be derived from software reuse.

(0.5 + 3.5 marks)

End of Paper